REMARKS

In section 6 of the Office Action, the Examiner rejected claims 60-65, 70-76, 78-82, and 84 under 35 U.S.C. §103(a) as being unpatentable over Khayrallah in view of Yagyu.

Independent claim 60 - Khayrallah fails to disclose decoding a code vector such that the decoding includes deriving a constellation of received signal values corresponding to the code vector, and generating a reliability factor based upon at least one of the received signal values such that the reliability factor is a measure of reliability of the decoding.

The Examiner points to column 7, lines 3-12 and lines 57-64 as a disclosure of the reliability recited in independent claim 60.

Column 7, lines 3-12 state that re-encoded, decoded symbols are used from a first pass for calculation of an error term, that the error term is used to update the channel estimate during a second pass, and that the channel tracker 50 more accurately tracks changes in the channel response of the channel corresponding to the received signal.

Column 7, lines 57-64 state that the output of the mode selector 56 is provided to the adaptive

propagation characterization estimator 32, that the mode selector 56 is provided re-encoded, decoded symbols from the decoder 58, and that these symbols correspond to the estimates of encoded information from the received signals after processing through error correction decoder 58 which are associated with particular portions of a received slot.

Accordingly, what Khayrallah is describing in this passage is the normal operation of a decision directed equalizer. A decision directed equalizer uses both training symbols and decoded symbols in order to determine the channel estimate from which the taps of the equalizer can be determined.

When training symbols are received, the received training symbols are compared to a reference comprising the known transmitted values of the training symbols. Any error between the received training symbols and the reference training symbols is used to adjust the taps of the equalizer.

When training symbols are not being received, the symbols at the output of the equalizer are decoded, and are then re-encoded so as to form a reference. This reference is then compared to the received symbols at the input of the equalizer. The error between the reference

re-encoded symbols and the equalizer input symbols is used to adjust the taps of the equalizer.

Thus, the error does not indicate the reliability of the decoder but instead is merely used to indicate the difference between the actual channel and the channel estimated by the equalizer.

On page 3 of the Office Action, the Examiner points to Khayrallah as a whole for a teaching the reliability of independent claim 60. However, Khayrallah as a whole merely teaches using a training mode and a decision directed mode as described above for estimating the channel. Neither mode is used to determine reliability of the decoder.

The Examiner points to column 3, lines 41-50, to column 11, lines 14-34, and to column 16, lines 46-59 to support the Examiner's contention that Khayrallah discloses generating a reliability factor as a measure of decoding reliability. However, these passages do not disclose generating such a reliability factor.

Column 3, lines 41-50 merely state that a multi-pass demodulation is a technique that takes advantage of the presence of coding in the communication system, as opposed to receivers that treat demodulation and decoding separately by producing hard or soft

decisions and separately decoding those decisions to produce final results.

Column 11, lines 14-34 merely state that the initial channel estimates obtained by the LS estimator from the training sequence are used as initial channel estimates for the channel tracker 51 and the impairment correlation estimator 52, that the LS estimator provides an average channel estimate during the training period because the channel may change very rapidly, that it is not desirable to use the initial channel estimates to track the channel, that instead the channel tracker 50 begins tracking the channel using symbol decisions, that, during the synchronization sequence, the channel estimator 32 typically converges to a reasonable value.

Column 16, lines 46-59 merely state that, in the case of Differential Quadrature Phase Shift Keying (DQPSK) modulation, the known bit information from the coded portions is determined from differential symbols or phase shifts between the transmitted symbols, that, while these symbols represent the known bit information from the first demodulation pass, only the phase shift between symbols can be reliably considered known, that, consequently, the channel estimated over those symbols could actually be a channel with an offset of plus $\pi/2$,

minus $\pi/2$, or π radian phase shift in absolute phase, and that this ambiguity in absolute phase is accommodated by interpolation.

As can be seen, these passages taken either singly or collectively merely describe using training sequences to determine the channel estimate during receipt of the synchronization portion of a frame, using symbol decisions to determine the channel estimate when the synchronization portion of a frame is not being received, and using interpolation to resolve ambiguities caused by phase shift keying modulation.

There is no mention here or in any portion of Khayrallah of generating a reliability factor as a measure of decoding reliability as required by independent claim 60.

Accordingly, Khayrallah does not disclose the reliability feature of independent claim 60.

The Examiner recognizes that Khayrallah fails to disclose the reliability feature of independent claim 60 and, therefore, relies on Yagyu, particularly pointing to column 1, lines 45-50.

Column 1, lines 45-50 of Yagyu merely state that two RSC codes are alternately MAP-decoded in the turbo decoder, that the reliability of the soft output of

the MAP decoder is iteratively updated, that the sign of the soft output is improved as a decoded output following a sufficient number of iteration steps, and that the amplitude of the soft output gradually increases during the iteration process.

As can be seen, this portion of Yagyu merely states that iteration is used to iteratively increase the reliability of the soft output of the MAP decoder. There is no mention in Yagyu of actually generating a reliability factor that is a measure of the reliability of the MAP decoder. Indeed, Yagyu provides no hint to one of ordinary skill in the art of how to measure the reliability of the MAP decoder.

Consequently, because neither Khayrallah nor Yagyu provides any hint to one of ordinary skill in the art of how to measure decoding reliability, Khayrallah and Yagyu, taken either alone or in combination, would not have suggested to one of ordinary skill in the art the actual generation of a reliability factor that is a measure of the decoding reliability.

For this reason, independent claim 60 is not unpatentable over Khayrallah in view of Yagyu.

Independent claim 73 also recites generating a reliability factor that is a measure of decoding reliability.

As discussed above, because neither Khayrallah nor Yagyu provides any hint to one of ordinary skill in the art of how to measure decoding reliability, Khayrallah and Yagyu, taken either alone or in combination, would not have suggested to one of ordinary skill in the art the actual generation of a reliability factor that is a measure of decoding reliability.

For this reason, independent claim 73 is not unpatentable over Khayrallah in view of Yagyu.

Independent claim 79 also recites generating a reliability factor that is a measure of the decoding reliability.

As discussed above, because neither Khayrallah nor Yagyu provides any hint to one of ordinary skill in the art of how to measure decoding reliability, Khayrallah and Yagyu, taken either alone or in combination, would not have suggested to one of ordinary skill in the art the actual generation of a reliability factor that is a measure of decoding reliability.

For this reason, independent claim 79 is not unpatentable over Khayrallah in view of Yagyu.

Because independent claims 60, 73, and 79 are not unpatentable over Khayrallah in view of Yagyu, dependent claims 61-65, 70-72, 74-76, 78, 80-82, and 84 are likewise not unpatentable over Khayrallah in view of Yagyu.

In addition, dependent claim 63 states that decoding reliability is determined based upon a difference between two of the received signal values included in the constellation of received signal values. Khayrallah discloses only an error, and the error is determined as the difference between the received signal and the re-encoded output of the decoder 58, not between two received signal values included in the constellation that is derived during decoding. Moreover, this error is a channel estimate error, not a decoding error.

The Examiner points to Figure 3, to column 8, lines 19-42, and to column 12, lines 35-45 of Khayrallah for the features of dependent claim 63.

Figure 3 is merely a block diagram of the baseband processor 20 and does not show how any reliability is determined.

Column 8, lines 19-42 of Khayrallah state that the output of equalizer 54 is de-interleaved and then fed to the decoder 58, and that the output of decoder 58 is

re-encoded, re-interleaved, and fed back for use by the equalizer 54 during a first demodulation pass as decoded estimates of the received signal. As can be seen, there is no disclosure or suggestion in this portion of Khayrallah of determining decoding reliability based on a difference between constellation values that are derived as part of the decoding process.

Column 12, lines 35-45 of Khayrallah merely describe the error between the signal as received and the signal from the decoder 58 as re-encoded. As discussed above, this error is a channel estimate error, not a decoding error. There is no disclosure or suggestion to one of ordinary skill in the art that this error is a measure of decoding reliability.

Accordingly, because there is no disclosure or suggestion to one of ordinary skill in the art to provide, in the system disclosed in Khayrallah, a decoding reliability measure as recited in dependent claim 63, dependent claim 63 is not unpatentable over Khayrallah.

For substantially the same reasons, dependent claim 64 is not unpatentable over Khayrallah.

With respect to dependent claim 64, the Examiner discusses tap values. However tap values are

the values to which the taps of the equalizer 54 of Khayrallah are set as a result of the processing performed by the path estimator 32. No difference between tap values is computed according to Khayrallah in order to provide a measure of decoding reliability. The material in column 13 of Khayrallah cited by the Examiner relates to pre-defining certain parameters of the channel tracker 50. This material has nothing to do with forming a difference that is indicative of decoding reliability.

Dependent claim 70 recites that the received signal values in the constellation are correlation peaks. There is no description in Khayrallah of correlation or correlation peaks that are useful in determining decoding reliability.

The Examiner asserts that Khayrallah discloses a correlation estimator at column 7, lines 38-50. These lines of Khayrallah state that the impairment correlation estimator 52 estimates spatially correlated interference based on the signals from the spatially diverse antennas 16. As can be seen, this impairment correlation estimator 52 does not suggest using correlation in order to provide correlation peaks that are used to derive a decoding reliability.

Accordingly, because there is no disclosure or suggestion to one of ordinary skill in the art to use, in the system disclosed in Khayrallah, correlation peaks in order to generate a decoding reliability measure, dependent claim 70 is not unpatentable over Khayrallah.

Dependent claim 71 states that the decoding reliability is determined based upon a difference between the squares of two of the received signal values included in the constellation of received signal values.

As discussed above, Khayrallah does not disclose a decoding reliability based on the difference between two received signal values included in the constellation that is derived during decoding. Therefore, Khayrallah cannot disclose a decoding reliability based on the difference between the squares of two such values.

Accordingly, because there is no disclosure or suggestion to one of ordinary skill in the art to provide, in the system disclosed in Khayrallah, a decoding reliability measure as recited in dependent claim 71, dependent claim 71 is not unpatentable over Khayrallah.

Dependent claim 72 is not unpatentable over Khayrallah for similar reasons.

Dependent claim 75 states that decoding reliability is determined based upon a difference between two values produced by the correlation between a received code vector and reference code vectors. Khayrallah discloses only an error, and the error is determined as the difference between the received signal and the re-encoded output of the decoder 58, not between two values produced by the correlation between the received code vector and the reference code vectors. This error is a channel estimate error, not a decoding error.

Accordingly, dependent claim 75 is not unpatentable over Khayrallah.

For substantially the same reasons, dependent claim 76 is not unpatentable over Khayrallah.

Dependent claim 78 states that decoding reliability is determined based upon a difference between the squares of two values produced by the correlation between the received code vector and the reference code vectors.

As discussed above, Khayrallah does not disclose a decoding reliability based on the difference between two values produced by the correlation between the received code vector and the reference code vectors. Therefore, Khayrallah cannot disclose a decoding

reliability based on the difference between the squares of two such values.

Accordingly, dependent claim 78 is not unpatentable over Khayrallah.

Dependent claim 81 states that decoding reliability is determined based upon a difference between two values of a constellation of a plurality of sets of values derived from a code vector. Khayrallah discloses only an error, and the error is determined as the difference between the received signal and the re-encoded output of the decoder 58, not between two values of a constellation of a plurality of sets of values derived from a code vector. Indeed, this error is a channel estimate error, not a decoding error.

Accordingly, dependent claim 81 is not unpatentable over Khayrallah.

For substantially the same reasons, dependent claim 82 is not unpatentable over Khayrallah.

Dependent claim 84 states that decoding reliability is determined based upon a difference between the squares of two values of a constellation of a plurality of sets of values derived from a code vector.

As discussed above, Khayrallah does not disclose a decoding reliability based on the difference

between two values produced by the correlation between the received code vector and the reference code vectors. Therefore, Khayrallah cannot disclose a decoding reliability based on the difference between the squares of two such values.

Accordingly, dependent claim 84 is not unpatentable over Khayrallah.

In section 7 of the Office Action, the Examiner rejected claims 66-69, 77, and 83 under 35 U.S.C. §103(a) as being unpatentable over Khayrallah in view of Yagyu and further in view of Molnar.

As discussed in applicants' previous response, Molnar also does not disclose or suggest generating a reliability factor as recited in independent claims 60, 73, and 79.

Molnar does mention performing a validity using a CRC or other error detection and/or correction technique. However, the validity check does not result in a reliability factor. It is merely used to determined which symbols in the symbol memory 95 should be changed.

Moreover, a CRC or other error detection and/or correction technique merely indicates whether data is correctly received, not whether data is corrected decoded. That is, a CRC or other error detection and/or

correction technique is not derived from the decoding process.

Accordingly, independent claims 60, 73, and 79 are not unpatentable over Khayrallah in view of Yagyu and further in view of Molnar.

Therefore, because independent claims 60, 73, and 79 are not unpatentable over Khayrallah in view of Yagyu and further in view of Molnar, dependent claims 66-69, 77, and 83 likewise are not unpatentable over Khayrallah in view of Yagyu and further in view of Molnar.

In addition, dependent claims 66, 77, and 83 recite that the reliability factor is generated based upon a comparison of a value to a threshold.

The Examiner points to column 3, lines 28-41 of Molnar for a discussion of thresholds. This portion of Molnar states that the steps of calculating the new received symbol estimates and performing subsequent differential MAP symbol estimation can be repeated until the improved estimates of the differential symbols converge to within a predetermined threshold. In other words, symbols are iteratively estimated until the differential symbols are close to a threshold value.

As can be seen, there is no suggestion here of comparing a value to a threshold in order to generate a decoding reliability.

For this additional reason, dependent claims 66, 77, and 83 are not unpatentable over Khayrallah in view of Yagyu and further in view of Molnar.

Dependent claims 67-69 are not unpatentable over Khayrallah in view of Yagyu and further in view of Molnar for similar reasons.

CONCLUSION

In view of the above, allowance of these claims and issuance of the above captioned patent application are respectfully requested.

The Commissioner is hereby authorized to charge any additional fees which may be required, or to credit any overpayment to Account No. 26 0175.

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